Year 2000 White Paper

Marin County Department of Information Services

Draft

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Scope

The purpose of this white paper is to identify the scope of the Year 2000 problem being tackled by the Department of Information Services, to describe the status of our efforts in resolving Year 2000 problems within this area of responsibility and to educate others in the county on areas they may investigate that are potentially vulnerable to the Year 2000 date changes.

What does Y2K mean?

The Year 2000 issue is not difficult to understand from the technical point of view. It is the scope of affected systems and business processes that makes this problem so challenging. The problem stems from three main issues: two-digit date storage, leap year calculations, and special meanings for dates. [1]

1. Two-digit date storage

The most common and most damaging problem occurs when software has been written to store and/or manipulate dates using only two digits for the year. Calculations built upon these dates will not execute properly because they will not see dates in the 21st century as being larger numbers than those in the 20th century.

Example: 2000 – 1998 = 2 but 00 – 98 = -98. (or 98 if the application does not allow negative numbers). The result of this might be that your accounting software sees all accounts receivable as overdue due to the fact that no customers have paid in 98 years.

The two-digit date convention assumes that the century is "19." This assumption was regarded as a necessity in the early days of commercial computing because of the high cost of computer storage and memory.

2. Leap year calculations

Leap years are calculated by a simple set of rules. Unfortunately, there are systems and applications that do not recognize the year 2000 as a leap year. This will cause all dates following February 29, 2000 to be offset incorrectly by one day. The rules for leap year calculations are as follows. A year is a leap year if it is divisible by four, but if it is divisible by 100 it is NOT a leap year, but if it is divisible by 400 it IS a leap year. Thus, the Year 2000 is a special case leap year that happens once every 400 years.[2]

3. Special meanings for dates

The third main Year 2000 problem is more commonly found in older code bases. In order to write more efficient code that allowed for the use of less memory, date fields were sometimes used to provide special functionality. The most common date used for this was 9/9/99. In some applications the use of the special date meant "save this data item forever" or "remove this data item automatically after 30 days," or "sort this data item to the top of the report." Within each organization, special date codes may have been used differently. This is one of the main reasons that no single tool can locate all uses and/or misuses of date data.

Technically, the problem is simple to understand. The solutions to the problem tend to be fairly simple as well. The scope of the problem, however, makes it difficult.

Every piece of hardware, software, and embedded system must be taken into account. Everything from mission-critical central accounting systems to small convenience applications must be examined for date-handling and how those dates might affect the rest of the environment."

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[1] Microsoft Web site
[2] Microsoft Web site

There are two possible scenarios of a breakdown

4. Complete system breakdown.

The first form of failure is that of complete breakdown. It will be easy to identify this because a complete failure is obvious and, therefore, easy to detect. In the event of a complete failure, contingency plans can be implemented and immediate action can be taken. For most individuals working on the Year 2000, this is the preferred type of failure due to its conspicuous nature.

Marin examples of a complete breakdown:

The Court sentences a defendant to three years of jail time. The sentence calculation computes 98 + 3 to mean 1901 rather than 2001. This inmate may never be released because the year 1901 will not show up on the Inmate release report.

Another example is the embedded system that has control of an obvious physical function such as door locks in the jail. So it is possible that even if the CJIS system is corrected, the automated locking system in the jail may fail to operate keeping the inmate locked in beyond his time of release. This could be considered double jeopardy.

5. Partial breakdown.

The second form of failure is that of partial breakdown. The partial breakdown is the more difficult problem to recognize and will have further-reaching consequences than that of complete failure. If a system only partially fails, it may not be obvious to the user of that system. In the case of financial transactions, a bad calculation may produce results that are assumed to be correct. The result of a partial failure will be the loss of trust in the computing environment's ability to deliver reliable, consistent information.

Marin examples of a partial breakdown:

A system designed to calculate child support interest on arrears payments might produce an incorrect result. If the application were to cease functioning it would be very obvious that there was a problem because the child support statement would not print. But, if the application still produces a statement, many child support calculations would be produced with incorrect interest calculations.

What kind of problem do we have?

County of Marin Government

1. Hardware

This area includes all mainframes, mini-computers, file servers and personal computers maintained by IST either on the computer room floor or in a department served by IST.

2. Operating System

This area includes all mainframes, file servers and personal computers maintained by IST such as Windows 95, Windows NT, UNIX and Workgroup for Windows.

3. Applications

The application area includes office automation products such as Microsoft Word, WordPerfect, cc:Mail as well as vendor supported data base applications such as the DPW CAMS system.

a. County IST applications
b. County Non-IST applications
c. Commercial applications running in the county
d. Commercially Supported Server Applications
e. Commercially Supported Desktop Applications

4. Data Interfaces

IST supports over 48 different routine transfers of data from one system to another. An example would be the Payroll to MARS transfer, the court calendars transfer to the Internet and the pay checks transfer to the Bank of America.

5. Network

The County's voice and data network inside all County-owned and IST supported facilities as well as the networks that connects those facilities are in this area.

6. Other

This is a catch-all category for Internal control systems such as climate control and security. Most of these systems are vendor maintained and the management of them is outside of IST.

Note: There are departments with their own internal computer support that need to review and resolve their hardware and software technologies from the same perspective.

Suppliers of essential services to the County of Marin

Many county departments rely on the supply of goods and services from vendors. It is quite possible that these suppliers may have a difficult time providing continuous service to the county.

It is the responsibility of each county department to identify these essential services and see assurances that they will continue through the year 2000 unimpeded.

Suppliers of essential services to the county citizens

Citizens are starting to become aware of the implications of the year 2000 problems. Many of them are looking to the county to assure them the essential services are maintained through the turn of the century. Example of services are: water, electricity, telephone, ambulance services, blood bank and paramedic services. It is the responsibility of each county department to identify these essential services and seek assurances that they will continue through the year 2000 unimpeded.

1. Hardware -- Information Services

The key issue with mainframe, mini-computer and personal computer hardware has to do with the ROM BIOS chip and its ability to handle the date changes needed to pass through the Year 2000.

Servers and Personal Computers -- Information Services	
IBM Mainframe.	Compliant -- Already running in the Year 2000
NT Fileservers	Compliant
Personal Computers – County BIOS	See Attachment 1
Apple Macintosh	Compliant
UNIX server for Imaging	Compliant
UNIX server for CHASER	Conversion to NT scheduled for July 1998.

2. Operating Systems

Operating systems manage the integrated use of all hardware components on behalf of applications such as Microsoft Word. These systems manage the addition and creation of files including date stamping.

IBM Mainframe system software	All software required to run in the Year 2000 is running and believes it is in the year 2000 in a separate test system
NT 4.0	Compatible -- Ref Microsoft
Novell Severs	Older 3.11 for DPW is not compatible. We have a plan to convert to MS NT January of 1999. HHS is on 4.11 which is Y2K compliant.
HP/UX -- SUNGARD 2000	Compatible
WIN95	Compatible
Windows 3.11	Compatible
MS-DOS 6.x	Compatible

3.a Applications Information Services

Information Services develops many County of Marin business applications. We have identified problem areas within our code and have been working toward Year 2000 compliance since 1996. We foresee no catastrophic problems associated with the turn of the century.

CJIS	Programs converted, testing will start this summer 1985-mandated 4 character dates in all data 1987-mandated all new systems development be set up for year 2000 1995-initiated an Y2K compliance review 1996-identified the work 1997-started correcting the problems
TAPIS/FAS	200 programs to convert and test this summer
Payroll	Converted and running. Further testing scheduled for this summer.
MARS -- Financial	Release 15 scheduled for Sept 1998 is compliant.
JURY	Compliant and is being converted to another compliant system before 1999.
Phoenix -- Civil	Compliant
RIDS	Compliant
Folder Tracking -- Welfare	Compliant

3.b Applications -- County Departments

Several county departments develop and maintain their own business application software. These departments are responsible for updating their code to conform to the year 2000 date changes.

Assessor	
District Attorney	All systems run in the Macintosh environment and are Year 2000 compliant
HHS	Small apps/ HHS will convert Delphi apps.

3.c Externally Supported Business Applications

HWDC		State has active Year 2000 projects on all of its systems including SAWS,MEDS, JPTA, EDD, CMS/CWS
HHS	GEMS-GEMS Works	compliant
DA	CHASER	
DPW	CAMS	
Health	CMMS	Under investigation
Mental Health	eCURA INSYST	
Library	Innovative Interfaces	Release 11 installed is Compliant
Sheriff	Identix	Compliant by this summer
Sheriff	Message Switch	Compliant
Sheriff	Civil	This summer with windows version of the product
Courts	Sungard 2000	Compliant

3.d Commercially Supported Server Applications

Microsoft Products	
Exchange	Compliant
SQL server	Compliant
SNA server	Compliant
Informix	
Version 5.x	Compliant
Netscape	
Server	Compliant
Suite Spot	Compliant

3.e. Commercially Supported Desktop Applications

Appendix 1 provides a detailed list of products and versions that support the Year 2000 standard. In general all new software purchased since 1996 is year 2000 compliant.

Microsoft Products	
Word	compliant
Excel	compliant
Access	compliant except version 2.0
Outlook	compliant
IBM Products	
cc:Mail	Not compliant/county is replacing
Corel	
WordPerfect	compliant
Perfect Office	compliant
Autodesk	
AutoCAD	compliant

4. Data Interfaces

SNA- Server 4.0 Gateway	Compliant
New file move software is year 2000	Compliant/ New Scheduling software installed and conversion has started. Older IBM gateways will be de-implemented over the next 18 months
File transfers See Attachment 3	

5. Network

Many network products do not use time-of-day (TOD) clocks in their design. Products that do not have TOD clocks have no potential Year 2000 operational issues. Most Network Interface Cards, modems, and simple repeaters do not have TOD clocks. This is true with some other products as well, but it is best not to generalize.

Hubs, Routers, Switches, NIC	3COM Compliant http://www.3com.com/products/yr2000_faq.html
PIX Firewall CISCO	Compliant http://www.cisco.com/warp/public/752/2000/cptbl.htm#IIAS
Controllers IBM	

6. Other

Other places micro-chips are used	
Environmental systems for the Civic Center	Compliant
Jail Locks system	Compliant in software by this summer, checking bios

Future Recommended Actions

A) Continue triage of all county systems.

B) Educate all County Department Heads on potential areas they need to evaluate.

C) Support Department Heads as needed to mitigate any Year 2000 problem.

D) Identify mission critical suppliers to the County and get assurances that their services will continue unimpeded through the turn of the century. Suppliers such as:

- *PG&E*
- *Pac Bell*
- *Water*
- *Ambulance services*
- *Blood bank*
- *Paramedic services*

E) Set up centralized coordination of all parts of the internal county Year 2000 program.

F) Set up methods for informing other public agencies on the year 2000 problem.

- *Cities --- MITC*
- *Special Districts*
- *MMWD*

G) Set up a central focal point to respond to public inquires.

Frequently Asked Questions

1.1. Does the Sheriff's Department, Marin County and the individual cities and towns have a Year 2000 computer millenium bug mitigation project?

1.1.1. What is the status of its mitigation activities?

1.1.2. To what extent does it include testing computer hardware and software?

1.1.3. To what extent does it include testing for embedded chips?

1.2. Which software-testing system is being used and/or what year 2000 computer-consulting firm has been contracted?

1.3. What is the definition of mission critical for each department (public safety as well as administration)?

1.4. What is the budget for these activities for calendar year 1998 and 1999? Part of the normal operating budget?

1.5. What is the scheduled test date for mission critical systems? Show a schedule

1.6. What assurances can you give that the Department's Office of Emergency Preparedness will be able to provide timely and effective service in the event of power, communication, and/or equipment failures?

1.7. What steps are being taken to ensure the public safety should traffic systems, security systems, water service, banks etc., fail?

1.8. Has the County and individual municipalities/towns developed contingency plans to ensure continued operation should third party supplier and vendor disruptions occur?

1.8.1. ambulance services

1.8.2. blood bank,

1.8.3. paramedic services

1.8.4. food for the County jail

1.8.5. vehicle repair support

1.8.6. Providers of services to the county,

1.8.7. water

1.8.8. electricity

1.8.9. telephone

1.8.10. State agencies we export/import data to and from.

1.9. Have the County developed contingency plans to ensure it will be able to continue to provide basic/essential/emergency services in the likelihood Y2K failures occur?

1.10. Will you publicly inform residents of your Y2K efforts and progress? If so, when, and by what means?